

CLAIMS

1. An occludator, comprising a lower bow-shaped part for mounting a lower jaw tooth mold, an upper bow-shaped part for mounting an upper jaw tooth mold, and right and left joints which connect the lower bow-shaped part and the upper bow-shaped part and enable a movement including an opening/closing movement and a lateral movement,

characterized in that the joint comprises an artificial condyle which is detachably mounted on the lower bow-shaped part and protrudes upward and an artificial articular fossa which is detachably mounted on the upper bow-shaped part and is opposed to the artificial condyle from above, a contour of at least one of the artificial condyle and the artificial articular fossa is shaped according to a contour of the mandibular condyle or the maxillary fossa of a person whose impression has been obtained during fabrication of the upper jaw tooth model.

2. The occludator according to claim 1, characterized in that the occludator comprises an elastic body for applying an urging force in a direction of bringing the lower bow-shaped part and the upper bow-shaped part relatively close to each other.

3. The occludator according to claim 1 or 2, characterized in that the joint is constituted of an upper joint and a lower joint which are opposed to each other, the upper joint is constituted of an upper mounting member supported by the upper bow-shaped part, a maxillary fossa model, and first mounting means for detachably mounting the pedestal of the maxillary fossa model on the upper mounting member, and the lower joint is constituted of a lower mounting member fixed on the lower bow-shaped part, a mandibular condyle model, and second mounting means for detachably mounting a pedestal of the mandibular condyle model on the lower mounting member.

4. The occludator according to claim 3, characterized in that the first mounting means is constituted of a male screw part formed on the upper mounting member, a

cylindrical member having a female screw formed in an inner surface, the female screw enabling to be screwed to the male screw, and an inner flange which is formed integrally with the cylindrical member, forms a hole permitting passage of the maxillary fossa model, and can make contact with a periphery of the pedestal of the maxillary fossa model, and the periphery of the pedestal of the maxillary fossa model is sandwiched between the upper mounting member and the inner flange by screwing the female screw to the male screw.

5. The occludator according to claim 3 or 4, characterized in that the second mounting means is constituted of a male screw part formed on the lower mounting member, a cylindrical member having a female screw formed in an inner surface, the female screw enabling to be screwed to the male screw, and an inner flange which is formed integrally with the cylindrical member, forms a hole permitting passage of the mandibular condyle model, and can make contact with a periphery of the pedestal of the mandibular condyle model, and the periphery of the pedestal of the mandibular condyle model is sandwiched between the lower mounting member and the inner flange by screwing the female screw to the male screw.

6. The occludator according to claim 3 or 5, characterized in that the first mounting means comprises a ring-shaped part which is formed on an end of the upper mounting member and has an inner concave part permitting insertion of the pedestal of the maxillary fossa model, and a fixing screw which can laterally penetrate the ring-shaped part while being connected to the ring-shaped part by screwing, and has an end capable of being screwed inward or in contact with a side of the pedestal of the maxillary fossa model.

7. The occludator according to claim 6, characterized in that the pedestal in cross section and the concave part of the ring-shaped part are both polygonal, and the pedestal is so shaped as to be engaged with the concave part of the ring-shaped part.

8. The occludator according to claim 3 or 4, characterized in that the second mounting means comprises a ring-shaped part which is formed on an end of the

lower mounting member and has an inner concave part permitting insertion of the pedestal of the mandibular condyle model, and a fixing screw which can laterally penetrate the ring-shaped part while being connected to the ring-shaped part by screwing, and has an end capable of being screwed inward or in contact with the side of the pedestal of the mandibular condyle model.

9. The occludator according to claim 8, characterized in that the pedestal in cross section and the concave part of the ring-shaped part are both polygonal, and the pedestal is so shaped as to be engaged with the concave part of the ring-shaped part.

10. The occludator according to any one of claims 3 to 9, characterized by further comprising upper positioning means for regulating a position of the pedestal of the maxillary fossa model relative to the upper mounting part.

11. The occludator according to any one of claims 3 to 7, characterized by further comprising lower positioning means for regulating a position of the pedestal of the mandibular condyle model relative to the lower mounting part.

12. The occludator according to any one of claims 1 to 11, characterized by further comprising position adjusting means for laterally adjusting a position of at least one of the artificial condyle and the artificial articular fossa.

13. The occludator according to any one of claims 1 to 12, characterized in that two or more pairs of the mandibular condyle model and the maxillary fossa model are provided, and a pair of the mandibular condyle model and the maxillary fossa model is used as the artificial condyle and the artificial articular fossa according to a shape of the temporomandibular joint of a person whose impression has been obtained during fabrication of the upper jaw tooth model.

14. The occludator according to any one of claims 1 to 13, characterized by further comprising connecting parts on a pair of lateral positions in the occludator, the connecting parts connecting the face bow.

15. A face bow used for the occludator according to claim 14, the face bow reproducing a positional relationship between a temporomandibular joint and an occlusion plane on the occludator,

characterized in that the face bow comprises a face bow body having a pair of right and left legs stretching symmetrically, a connecting part which is provided on an end of each leg and can be connected to the connecting part of the occludator, and a nose piece which is supported by the face bow body and brought into contact with a hollow on an upper part of a nose of a patient, and

the nose piece comprises a position adjusting mechanism capable of adjusting a position at least in a vertical direction and a longitudinal direction with respect to the face bow body.

16. The face bow according to claim 15, characterized in that the face bow body comprises a level.

17. The face bow according to claim 15 or 16, characterized in that the connecting part provided on the end of the leg is an ear rod which can be inserted into an external auditory meatus of a patient, and the connecting part of the occludator is constituted of an insertion hole permitting insertion of the ear rod.

18. The face bow according to claim 17, characterized in that the face bow body is made of a material permitting passage of an X-ray beam, and the face bow body comprises a marking member which is laterally opposed to a center of a mandibular condyle of a patient or a vicinity of the center in front of the ear rod and is made of a material not permitting the passage of an X-ray beam, and a supporting member causing the leg to support the marking member.

19. An occlusion confirming system, comprising a CT device for photographing a temporomandibular joint of a target person, a stereolithography machine for forming a solid model of the temporomandibular joint on a basis of three-dimensional image data of the temporomandibular joint specified by image information photographed by the CT device, and

an occludator including a lower bow-shaped part for mounting a lower jaw tooth mold, an upper bow-shaped part for mounting an upper jaw tooth mold, and right and left joints for connecting the lower bow-shaped part and the upper bow-shaped part,

characterized in that the joint comprises an artificial condyle which is mounted on the lower bow-shaped part and protrudes upward and an artificial articular fossa which is mounted on the upper bow-shaped part and is opposed to the artificial condyle from above, at least one of the artificial condyle and the artificial articular fossa is constituted of the solid model formed by the stereolithography machine.

20. An occlusion confirming system characterized by comprising an occludator including a lower bow-shaped part for mounting a lower jaw tooth mold, an upper bow-shaped part for mounting an upper jaw tooth mold, and right and left joints for connecting the lower bow-shaped part and the upper bow-shaped part, the joint being constituted of a mandibular condyle model which is detachably mounted on the lower bow-shaped part and a maxillary fossa model which is detachably mounted on the upper bow-shaped part so as to be vertically opposed to the mandibular condyle model,

two or more kinds of mandibular condyle models and maxillary fossa models used on the occludator,

a database for storing information about the two or more kinds of mandibular condyle models and maxillary fossa models,

a CT device for photographing a temporomandibular joint of a target person, and

selecting means for selecting a specific mandibular condyle model and maxillary fossa model to be mounted on the occludator from the two or more kinds of mandibular condyle models and maxillary fossa models with reference to the

database, on a basis of three-dimensional image data of the temporomandibular joint specified by image information photographed by the CT device.

21. An occlusion confirming system comprising:

a database for storing three-dimensional image data of the two or more kinds of mandibular condyle models and maxillary fossa models,

a CT device for photographing a temporomandibular joint of a target person,

selecting means for selecting a mandibular condyle model and a maxillary fossa model which are closer to the three-dimensional shape of the photographed temporomandibular joint among the two or more kinds of mandibular condyle models and maxillary fossa models on a basis of three-dimensional image data of the temporomandibular joint specified by image information photographed by the CT device or characteristic information and three-dimensional image data in the database, a stereolithography machine for forming a solid model of the mandibular condyle model and maxillary fossa model having been selected by the selecting means, on a basis of the data in the database, and

an occludator including a lower bow-shaped part for mounting a lower jaw tooth mold, an upper bow-shaped part for mounting an upper jaw tooth mold, and right and left joints for connecting the lower bow-shaped part and the upper bow-shaped part,

characterized in that the joint comprises an artificial condyle which is mounted on the lower bow-shaped part and protrudes upward and an artificial articular fossa which is mounted on the upper bow-shaped part and is opposed to the artificial condyle from above, the solid model formed by the stereolithography machine is used as at least one of the artificial condyle and the artificial articular fossa.

22. The occlusion confirming system according to any one of claims 19 to 21, characterized by further comprising an elastic body for applying an urging force in a

direction of bringing the lower bow-shaped part and the upper bow-shaped part relatively close to each other.

23. The occlusion confirming system according to any one of claims 19 to 22, characterized in that the joint is constituted of an upper joint and a lower joint which are opposed to each other, the upper joint is constituted of an upper mounting member supported by the upper bow-shaped part, a maxillary fossa model, and first mounting means for detachably mounting a pedestal of the maxillary fossa model on the upper mounting member, and the lower joint is constituted of a lower mounting member fixed on the lower bow-shaped part, a mandibular condyle model, and second mounting means for detachably mounting a pedestal of the mandibular condyle model on the lower mounting member.

24. The occlusion confirming system according to claim 23, characterized in that the first mounting means is constituted of a male screw part formed on the upper mounting member, a cylindrical member having a female screw formed in an inner surface, the female screw capable of being screwed to the male screw, and an inner flange which is formed integrally with the cylindrical member, forms a hole permitting passage of the maxillary fossa model, and can make contact with a periphery of the pedestal of the maxillary fossa model, and the periphery of the pedestal of the maxillary fossa model is sandwiched between the upper mounting member and the inner flange by screwing the female screw to the male screw.

25. The occlusion confirming system according to claim 23 or 24, characterized in that the second mounting means is constituted of a male screw part formed on the lower mounting member, a cylindrical member having a female screw formed in an inner surface, the female screw enabling to be screwed to the male screw, and an inner flange which is formed integrally with the cylindrical member, forms a hole permitting passage of the mandibular condyle model, and can make contact with the periphery of a pedestal of the mandibular condyle model, and the periphery of the pedestal of the mandibular condyle model is sandwiched between the lower

mounting member and the inner flange by screwing the female screw to the male screw.

26. The occlusion confirming system according to claim 5 or 25, characterized in that the first mounting means comprises a ring-shaped part which is formed on an end of the upper mounting member and has an inner concave part permitting insertion of the pedestal of the maxillary fossa model, and a fixing screw which can laterally penetrate the ring-shaped part while being connected to the ring-shaped part by screwing, and has an end capable of being screwed inward or in contact with a side of the pedestal of the maxillary fossa model.

27. The occlusion confirming system according to claim 23 or 24, characterized in that the second mounting means comprises a ring-shaped part which is formed on an end of the lower mounting member and has an inner concave part permitting insertion of the pedestal of the mandibular condyle model, and a fixing screw which can laterally penetrate the ring-shaped part while being connected to the ring-shaped part by screwing, and has an end capable of being screwed inward or in contact with a side of the pedestal of the mandibular condyle model.

28. The occlusion confirming system according to any one of claims 23 to 27, characterized by further comprising upper positioning means for regulating a position of the pedestal of the maxillary fossa model relative to the upper mounting part.

29. The occlusion confirming system according to any one of claims 23 to 28, characterized by further comprising lower positioning means for regulating a position of the pedestal of the mandibular condyle model relative to the lower mounting part.

30. The occlusion confirming system according to any one of claims 19 to 29, characterized by further comprising position adjusting means for laterally adjusting a position of at least one of the artificial condyle and the artificial articular fossa.

31. The occlusion confirming system according to any one of claims 19 to 30, characterized by further comprising a face bow including a face bow body which is used for reproducing a positional relationship between the temporomandibular joint and an occlusion plane on the occludator and has a pair of right and left legs stretching symmetrically,

characterized in that at least the right and left legs are made of a material permitting passage of a light beam used in the CT device, and at least one marking member is provided on an end of each of the right and left legs, the marking member being made of a material not permitting the passage of the light beam.

32. The occlusion confirming system according to claim 31, characterized in that the face bow comprises a nose piece which is supported by the face bow body and brought into contact with a hollow in an upper part of a nose of a patient, and the nose piece comprises a position adjusting mechanism capable of adjusting a position at least in a vertical direction and a longitudinal direction with respect to the face bow body.

33. The occlusion confirming system according to claim 31 or 32, characterized in that the face bow body comprises a level.

34. The occlusion confirming system according to any one of claims 31 to 33, characterized in that the marking member is disposed on a position presumed to be laterally opposed to a center of the mandibular condyle of a patient.

35. The occlusion confirming system according to any one of claims 31 to 34, characterized by further comprising an ear rod on an end of the leg in the face bow, the ear rod being inserted into an external auditory meatus of a patient, and each of right and left sides of the occludator has an insertion hole for insertion of the ear rod.

36. The occlusion confirming system according to claims 31 to 34, comprising a headgear fixed on a head of a target person, characterized in that the head gear comprises right and left connecting parts for temporarily connecting right and left

ends of the face bow and connection position adjusting means for adjusting a position of the connecting part to a predetermined position.

37. The occlusion confirming system according to claim 36, characterized in that the headgear comprises fixing means for temporarily fixing the headgear to the CT device.

38. The occlusion confirming system according to any one of claims 19 to 37, comprising a database for storing ideal model information about a temporomandibular joint condyle, characterized in that the system further comprises data correcting means for correcting three-dimensional data on the temporomandibular joint condyle specified by image information photographed by the CT device such that a contour of the temporomandibular joint condyle specified by the image information photographed by the CT device is identical to a contour protruding closer to an ideal model, when a comparison is made between the contour of the temporomandibular joint condyle specified by the image information photographed by the CT device and the corresponding ideal model on the database and it is decided that the temporomandibular joint condyle wears more than a predetermined degree.

39. A temporomandibular joint reproducing system, characterized by comprising a CT device for photographing a temporomandibular joint of a target person, and a stereolithography machine for forming a solid model of a temporomandibular joint on a basis of three-dimensional data of the temporomandibular joint specified by image information photographed by the CT device.

40. The temporomandibular joint reproducing system according to claim 39, comprising a face bow including a face bow body which is used for reproducing a positional relationship between the temporomandibular joint and an occlusion plane on the occludator and has a pair of right and left legs stretching symmetrically, characterized in that at least the right and left legs are made of a material permitting passage of a light beam used in the CT device,

a marking member is provided on an end of each of the right and left legs on a position presumed to be laterally opposed to a center of the mandibular condyle of a patient, the marking member being made of a material not permitting passage of the light beam, and a forming area B for stereolithography is specified according to a position of the photographed marking member.

41. The temporomandibular joint reproducing system according to claim 21 or 40, characterized by comprising a data conversion section for converting three-dimensional image data of the temporomandibular joint specified by the image information photographed by the CT device, into two-dimensional contour image data of multiple layers for stereolithography, and transmitting means for transmitting the two-dimensional contour image data of multiple layers, which have been converted by the data conversion section, to the stereolithography machine via communication means.

42. The temporomandibular joint reproducing system according to claim 41, characterized in that the two-dimensional contour image data transmitted by the transmitting means is coordinate data of two or more points for specifying a two-dimensional contour of a corresponding cross section.